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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/618,317	07/11/2003	Guolin Ma	10020800-1	4776

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AVAGO TECHNOLOGIES, LTD.  
P.O. BOX 1920  
DENVER, CO 80201-1920

EXAMINER

HOLTON, STEVEN E

ART UNIT PAPER NUMBER

2629

DATE MAILED: 08/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/618,317

Applicant(s)

MA ET AL.

Examiner

Steven E. Holton

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 24 April 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,3-8,12 and 13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-8,12 and 13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

1. This Office Action is made in response to applicant's amendment filed on 4/24/2006. Claims 1, 3-8, 12 and 13 are currently pending in the application. An action follows below:
2. In light of the remarks entered by the applicant, the finality of the previous action is removed and this non-final action is provided.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 3-8, 12, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Son (USPN: 6741234) in view of Zimmerman, and further in view of Dimmick and further in view of Butterworth.

Regarding claim 8, Son discloses an optical mouse with a housing (Fig. 7, element 26), an image sensor (Fig. 7, element 27) for capturing images of a surface (Fig. 7, element 28), an optical conduit made from optically transmissive material, channeling light from the light source onto the surface (Fig. 8, element "light emitting lense") with an input and output and a lens to focus the light reflecting off the surface

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onto the image sensor (Fig. 7, element 25). However, Son does not expressly disclose the optical conduit having a curved interior surface, a light source embedded within the optical conduit or a reflector cup embedded within the optical conduit and surrounding the light source.

Zimmerman discloses an optical conduit having a curved interior surface (Fig. 11, element 426). However, Zimmerman does not expressly disclose having the light source embedded within the input end of the optical conduit.

At the time of invention it would have been obvious to one skilled in the art to modify the teachings of Son with the teachings of Zimmerman to produce an optical mouse that utilizes a light emitting lense with a curved interior surface rather than a system with straight interior surfaces as depicted by Son. As shown by the different geometries of optical conduits used by Zimmerman in figures 11 and 12, it would have been a matter of design choice for one skilled in the art to pick a shape of optical conduit of any type desired to direct light to the desired output location. However, the combination of Son and Zimmerman do not expressly disclose embedding the light source into the optical conduit, nor embedding a reflector cup around the light source to direct light towards the output of the optical conduit.

Dimmick discloses a light source (Fig. 3, element 90) of a light emitting diode (LED) embedded in an end of the light pipe (col. 6, lines 33-41 and col. 11, lines 22-27). However, Dimmick does not expressly disclose a reflector cup embedded in the optical conduit surrounding the light source to redirect light towards the exit of the optical conduit.

At the time of invention it would have been obvious to one skilled in the art to modify an optical mouse system of the combination of Son and Zimmerman with the teachings of Dimmick regarding inserting a light source into an optical conduit. The motivation for doing so would have been so that the light source only provides illumination to the light conduit and display areas beyond the conduit rather than losing light to surrounding areas and to reduce maintenance and cost of operation (Dimmick, col. 3, line 63 – col. 4, line 1). However, the combination of Son, Zimmerman, and Dimmick do not expressly disclose embedding a reflector cup that surrounds the light source into the optical conduit to redirect light towards the output of the optical conduit.

Butterworth discloses a light emitting diode comprising a light source (Figs. 1 and 2, element 110) that is surrounded by a reflector cup (Figs. 1 and 2, element 120). The reflector cup redirects light so that most of the light is directed in a chosen direction from the LED.

At the time of invention it would have been obvious to one skilled in the art to combine the teachings of Sun, Zimmerman, Dimmick, and Butterworth. The motivation for doing so would have been to utilize a light emitting diode source that is efficient and produces light over a broad portion of the visible spectrum (Butterworth, col. 2, lines 7-16). By inserting an LED such as one described by Butterworth into the optical conduit as discussed by Dimmick this would result in the optical conduit having a light source and reflector cup embedded within the optical conduit. This would produce the device as disclosed in claim 8.

Regarding claim 12, Zimmerman discloses an optical pipe for transmitting light from an input to output that uses a parabolic shape (Fig. 11, element 426 and col. 13, line 63 – col. 14, line 2). The Examiner notes that the figure shown is a cross-section of the optical pipe and the three dimensional light pipe would then have a paraboloid shape.

Regarding claim 13, the Examiner notes that the limitations of claim 13 are similar to the limitations of claim 8, but lack the requirement of having a curved interior surface within the optical conduit. Obviously a curved interior surface discussed in claim 8 would read on an interior surface as described in claim 13. Therefore, the arguments made regarding claim 8 may be further applied to the more generic claim 13.

Regarding claim 1, the Examiner notes that claim 1 lacks the requirements of a housing, image sensor and lens that are part of claim 8. However, the optical conduit with an input, output and curved interior surface, and a light source and reflector cup embedded within the optical conduit are the same as recited within claim 8. Therefore, the arguments regarding the optical conduit that are presented for claim 8 can be similarly applied to the limitations of claim 1.

Regarding claim 3, Zimmerman discloses an optical pipe for transmitting light from an input to output that uses a parabolic shape (Fig. 11, element 426 and col. 13, line 63 – col. 14, line 2).

Regarding claim 4, the Examiner states that light conduits shown by Zimmerman show that different shapes of the surfaces of the conduits are possible by one skilled in the art. Therefore, forming the body of the light conduit so that curved surfaces of the

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conduit fit different equations would be a matter of design choice for one skilled in the art.

Regarding claim 5, Dimmick discloses using a light emitting diode as the light source (Fig. 3, element 90).

Regarding claim 6, Son discloses an optical conduit (Fig. 18, element "light-emitting lens") for use in an optical mouse where the conduit has a gradual bend so that the output end and the input end are at an angle different from each other. The angle of difference of the input and output ends of the optical conduit are less than 90°.

Regarding claim 7, Dimmick discloses the light pipe can be made out of acrylics or plastics (col. 6, lines 27-32). The Examiner also notes that the materials described are commonly known in the art as suitable materials for constructing a light conduit. As such, it would be a matter of design choice for one skilled in the art to form a light conduit out of one of the listed materials.

### ***Response to Arguments***

4. Applicant's arguments with respect to claims 1 and 3-7 have been considered but are moot in view of the new ground(s) of rejection.

Regarding the comments about Dimmick reciting the use of a translucent light pipe that does not completely direct light from one end to another. The Examiner agrees that Dimmick is directed to a light pipe that would unsuitable for use within an optical mouse due to the light transmission from the sides of the light pipe. The

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inclusion of Dimmick is not intended to provide a light pipe to the system, but to show that the insertion of a light source within a light pipe is known to provide improved efficiency of transmitting light from the light source to the light pipe. Dimmick points out that by inserting the lights into the light pipe there is no 'down light' or light that is radiated from parts other than the illuminated light pipes. It would be obvious to one skilled in the art that insertion of the light source into the light pipe would have the same effect of reducing or eliminating any light being lost to areas outside of the light pipe itself by removing the need of transmitting the light from the light to an input of the light pipe using mirrors or other optical means.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven E. Holton whose telephone number is (571) 272-7903. The examiner can normally be reached on M-F 8:30-5.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amr Awad can be reached on (571) 272-7764. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Steven E. Holton  
Division 2629  
August 17, 2006



**BIPIN SHALWALA**  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2600